8-4: Radical Notation for n^{th} Roots

Warm-up: What is the length of the side of a cube whose volume is 512 cm^3?

When we saw n^{th} roots in chapter 7, we used the following notation:

The square root of x =

Definition:

Example 1: Evaluate without using a calculator.

a. $\sqrt[3]{27}$ b. $\sqrt[6]{64}$

Example 2: Use a calculator to estimate to the nearest hundredth.

a. $\sqrt{15}$ b. $\sqrt[5]{4829}$ c. $\sqrt[4]{2401}$

****Notice:*

We can use the same ideas with radicals that we saw with rational powers.

Root of a Power Theorem:

Example 3: Simplify for $x \geq 0$.

a. $\sqrt[4]{x^8}$ b. $\sqrt[3]{x^{18}}$

***When taking an even root of an even power, the absolute-value square root theorem takes effect! In most cases, it will be stated that $x \geq 0$.
We can even use this idea when radicals are inside radicals!

Example 4: Suppose $x \geq 0$. Rewrite using rational exponents.

a. $\sqrt[6]{\sqrt{x}}$ b. $\sqrt[3]{\sqrt[4]{x^2}}$

Example 5: Rewrite using radical signs.

a. $x^{\frac{1}{3}}$ b. $x^{\frac{4}{7}}$

Homework:

"The only way most people recognize their limits is by trespassing on them."
- Tom Morris